

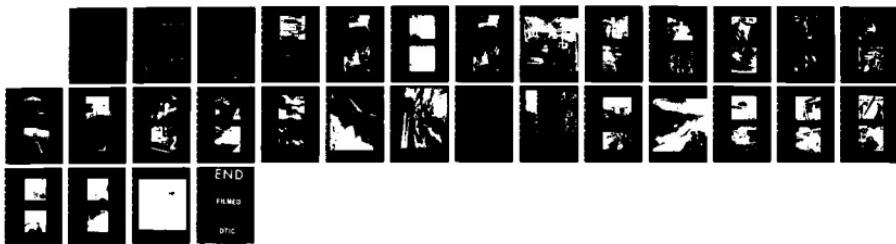
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CLARENCE CANNON DAM AND MARK TWAIN LAKE FOUNDATION AND  
EMBANKMENT COMPLET (U) ARMY ENGINEER DISTRICT ST LOUIS  
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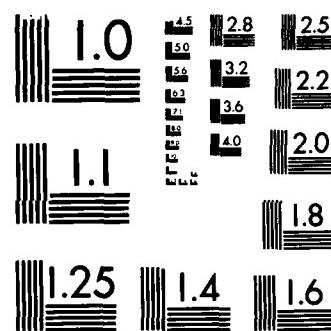
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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

**CLARENCE CANNON DAM  
& MARK TWAIN LAKE**

(6)

**AD-A160 531**

**FOUNDATION AND EMBANKMENT COMPLETION REPORT**

**PART II MAIN DAM**

**PHASE II CONSTRUCTION AND RELATED CONTRACTS**

**VOLUME III — PHOTOGRAPHS**

**PAGES 384 THRU 409**

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**US Army Corps  
of Engineers  
St. Louis District**

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**DECEMBER 1984**

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## SECTION 5

### FOUNDATION INSTRUMENTATION

	<u>PAGES NOS.</u>
A. EMBANKMENT	384 - 394
B. STRUCTURE	395 - 400

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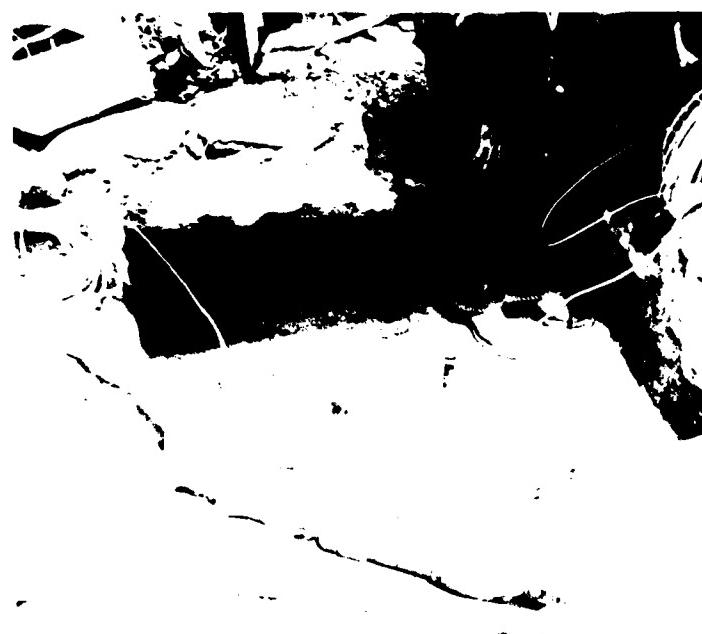
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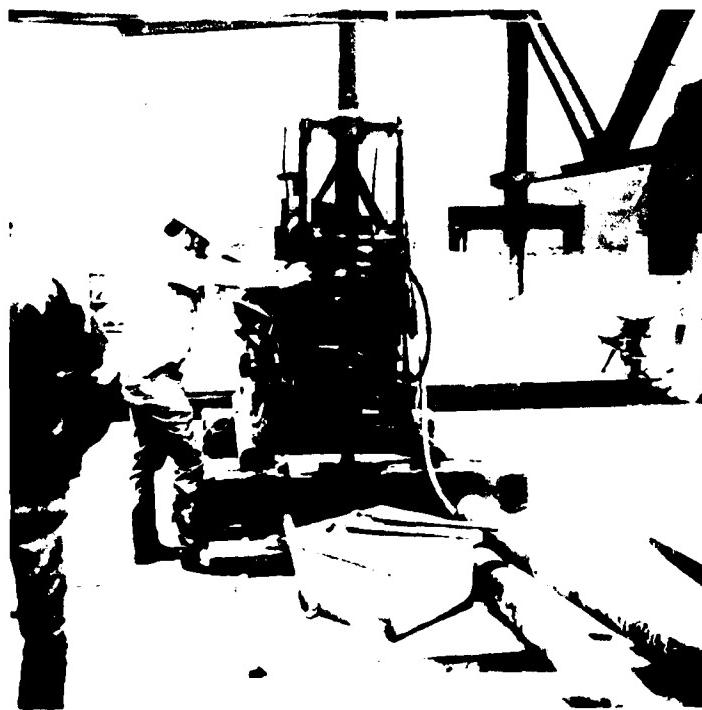
Shale core sample from bottom of piezometer no. PBS-12 core boring beneath the structure.



Shale core sample from bottom of piezometer no. PBS-15 core boring beneath the structure.



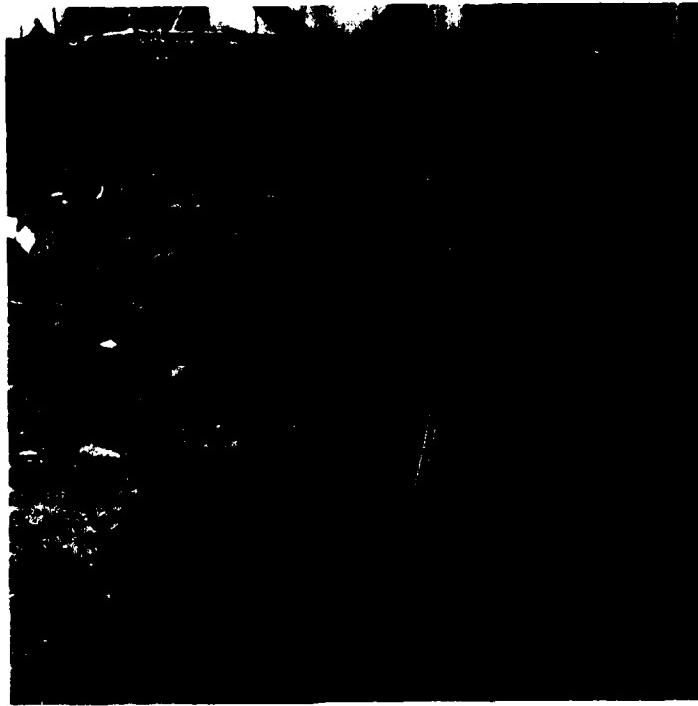
PVC pipe blockout for piezometer no. PCS-06 in the foundation of Monolith SP-1.



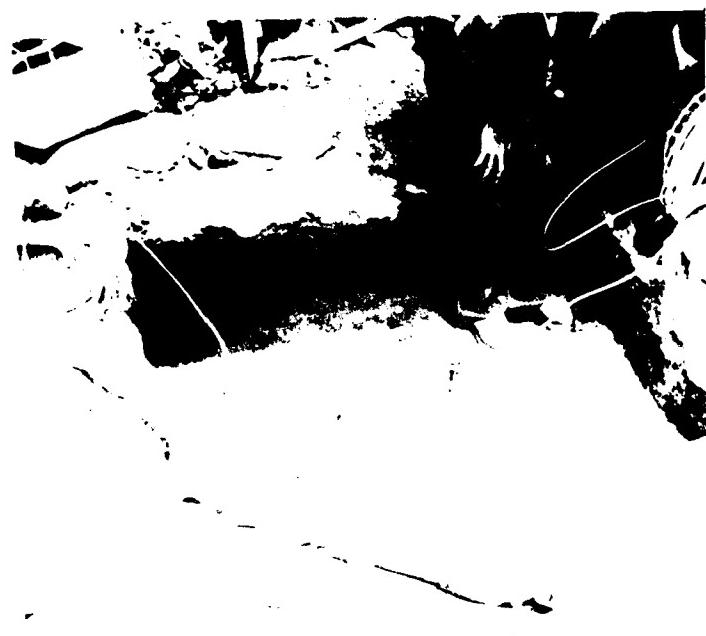
Closeup of PVC pipe blockout for PCS-06 in the foundation of Monolith SP-1. The height of the pipe represents the amount of overexcavation.



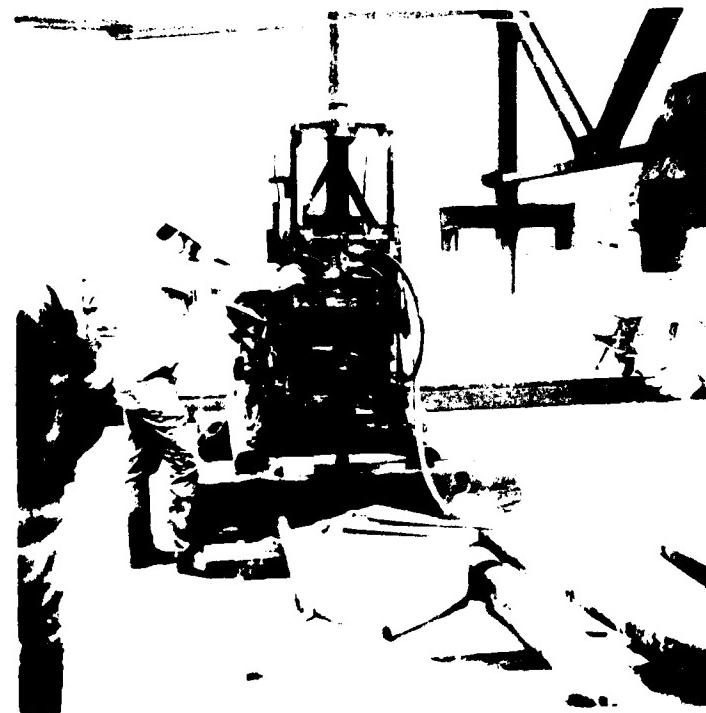
Installation of piezometer no. PCS-09 and conduit trenching in the Stilling Basin slab foundation.



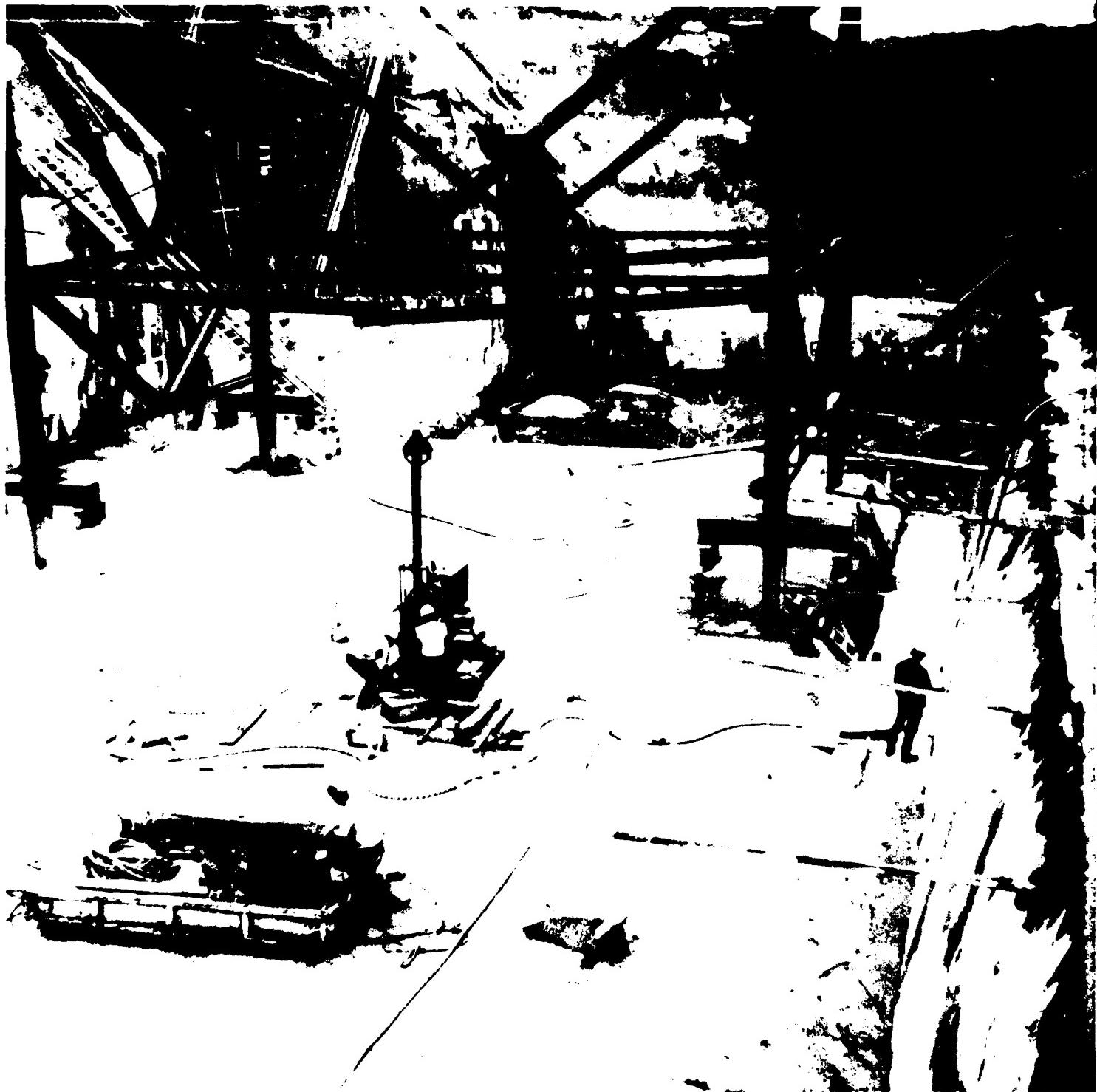
Instrumentation conduit trench in Stilling Basin slab foundation after installation of piezometer no. PCS-08. Remaining conduit is for Carlson electrical resistance piezometer nos. CA-11 and CA-17.



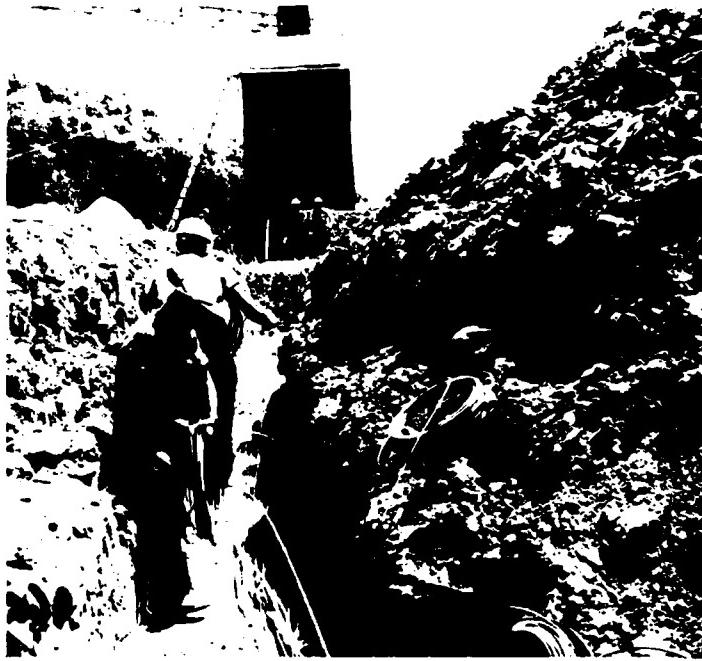
Installation of piezometer nos. CA-25 and CE-04 (Monolith SB-3) in a small excavation prior to backfilling with protective concrete.



Drilling operations for the installation of Inclinometer no. DT-05 in Monolith SB-3. Wooden box with pipe wrenches on top is the storage box for the leads from the Carlson electrical resistance piezometer and soil pressure meter installed in the foundation of SB-3.



Overall view of Monolith SB-3 foundation showing drilling operation for Inclinometer no. DT-05 core hole.



Station 12+75 U.S.B.R. piezometer tubing being unrolled in trench prior to spacing and placement of select material.



Station 12+75 U.S.B.R. piezometer tubing. Note the leveling of the select material cushion in trench.



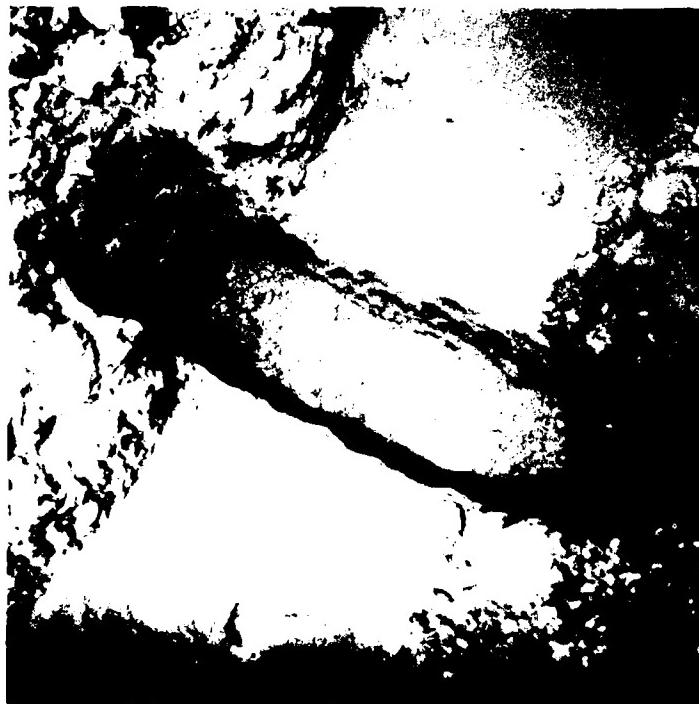
Terminal Well no. 1 with the Station 12+75 entrance conduit in place. The notch in the sides and bottom of the trench was the excavation for a trench collar. Exposed crushed rock below the terminal well base corresponds with the elevation of the downstream sand blanket drain.



Piezometer test program trench in temperature control weir embankment. Metal pipes in the edge of the trench are protection for the drill holes for three different types of foundation tips.



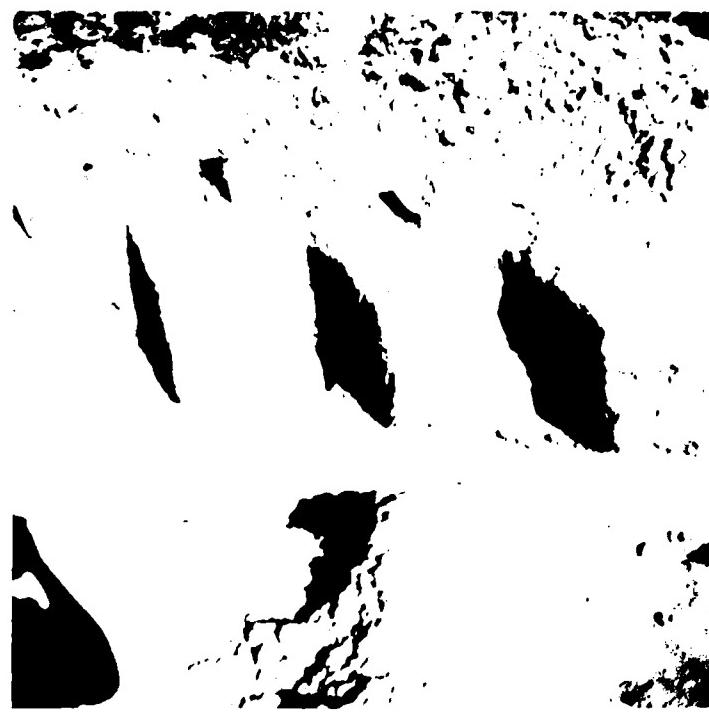
Leads of three different types of foundation piezometers extending into the trench. The pair of white leads is the tubes from the U.S.B.R. tip; the heavy black cable is the Carlson lead wire; and the small black lead is the SINCO pneumatic tubing.



Trench collar excavation.



Select material (cushion) being compacted with a 1 square foot, tamper.



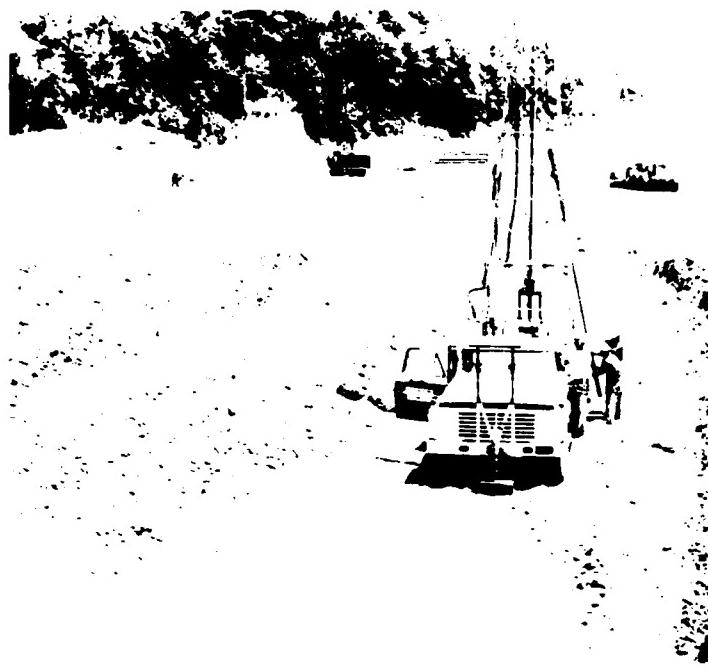
Excavated slots for the three different types of embankment piezometer tips installed in the piezometer tip program.



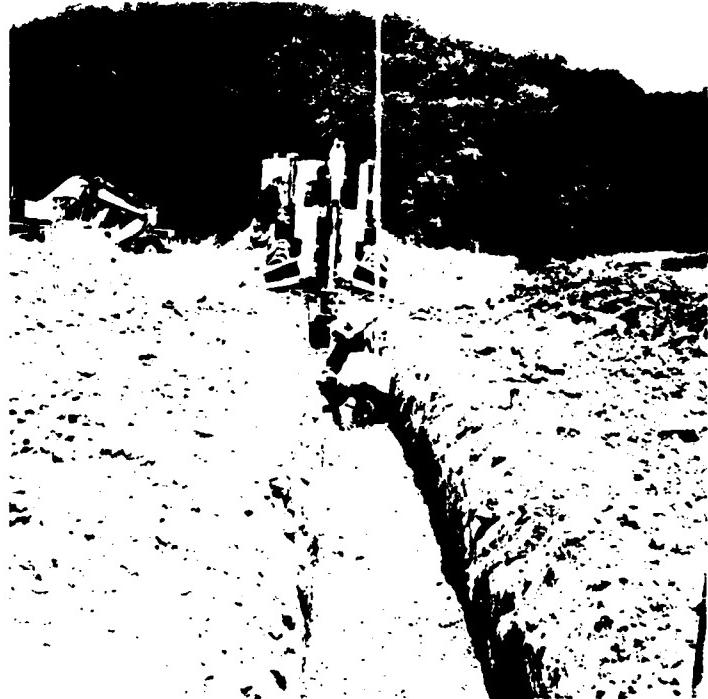
Method of storage for the replacement line of U.S.B.R. piezometers at Station 11+43 (centerline) from October 1975 to July 1980.



Typical testing setup for the replacement line of U.S.B.R. piezometer at Station 11+43.



Shelby tube sample being removed from drill rods. Sample is for piezometer no. FBF-04 replacement, Station 11+45, 130' downstream.



Piezometer trench excavation and setting of nails into trench walls. The lower nail was used to establish the top elevation of the cushion of select material while the upper nail established the top elevation of select material placed over the piezometer tubes.



Terminal Well No. 1, entrance conduit for U.S.B.R. piezometer tubes (Stations 11+43, 11+45 and 12+75). The location of the shovel point represents the approximate top elevation of the sand blanket.



U.S.B.R. foundation piezometer tip just prior to installation.



Depth being measured and marked on the piezometer tubing to facilitate installation in the bore hole.



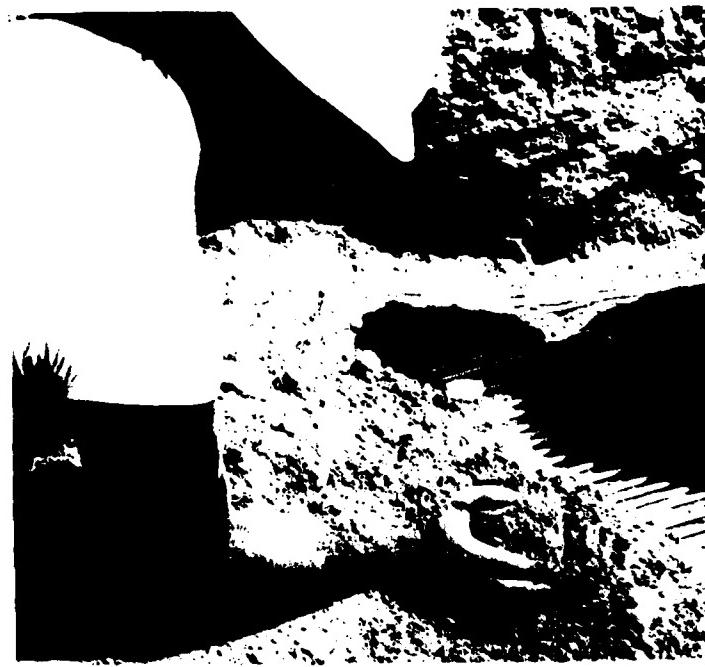
U.S.B.R. foundation piezometer tip being lowered into the boring.  
Metal pipe on left hand side of photo was the handle for the "U" shaped  
tamping foot used to compact the backfill material in the bore hole.



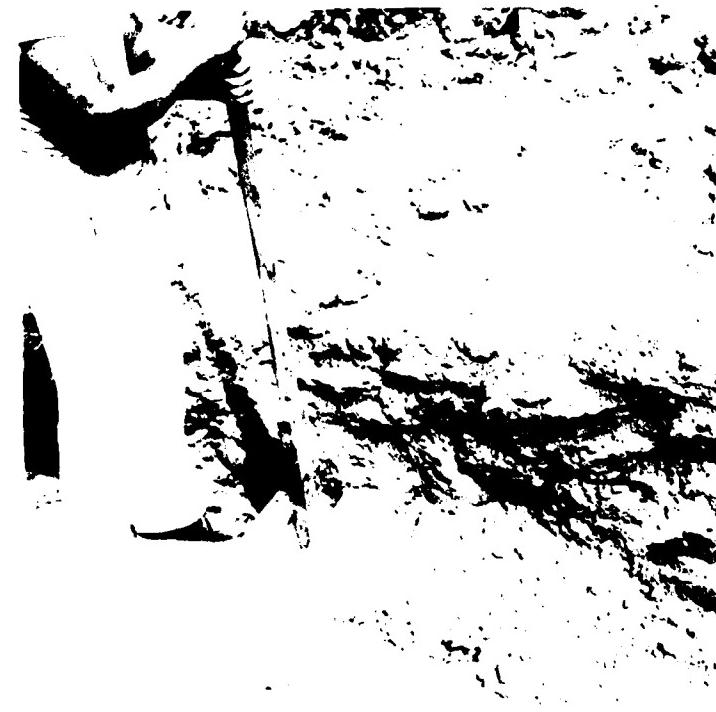
Station 16+60 U.S.B.R. foundation piezometer trench at the point where the last pair of piezometer tubes enters the trench.



Technique and tools used for spacing the piezometer tubes in the trench.



Select material being hand placed over the U.S.B.R. piezometer tubing.



Hand placed select material being hand compacted with a 1 square foot tamper.



Station 16+60 U.S.B.R. foundation piezometer tubing at the point where the tubing enters the entrance to Terminal Well No. 2. Note the excess granulated bentonite (base of conduit) for the sealing operation around the piezometer tubes. The placement of oakum will be the final step in the sealing operation.



Station 16+60 U.S.B.R. foundation trench. The mechanical tamper in the foreground was used to compact the remaining 18" of fill in the trench. The motor patrol blade was used to remove the dry embankment material at the top edge of the trench above the 24" limit prior to resumption of normal fill placement and compaction.

**SECTION 6**

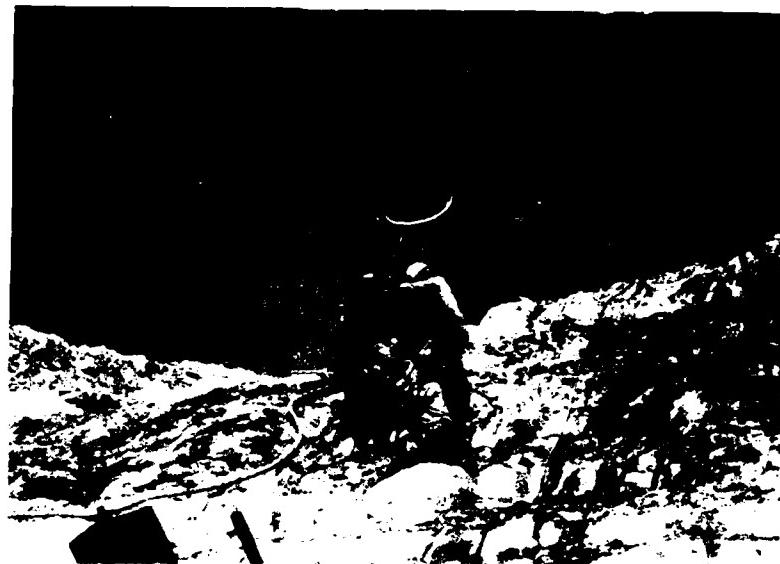
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**DRILLING AND GROUTING**

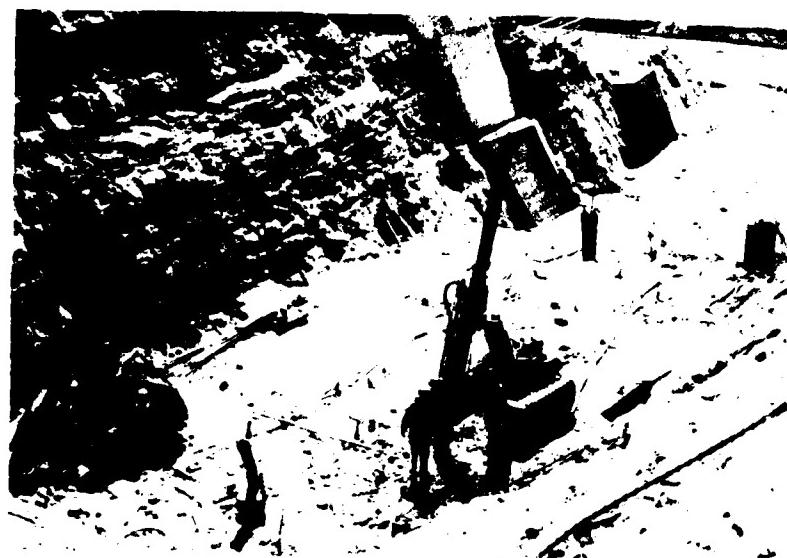
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Main dam abutment and uplands grouting contract. Right abutment, typical pressure testing operation.



Main dam abutment and uplands grouting contract. Left abutment, drilling with C.P. 65 on rear cutoff trench slope.



Main dam abutment and uplands grouting contract. Left abutment cutoff trench, El. 620 bench. Drilling upstream primary grout holes with air track.



Main dam abutment and uplands grouting contract. Left abutment cutoff trench, El. 610 bench. Typical setup for drilling and grouting operations on consolidation borings.



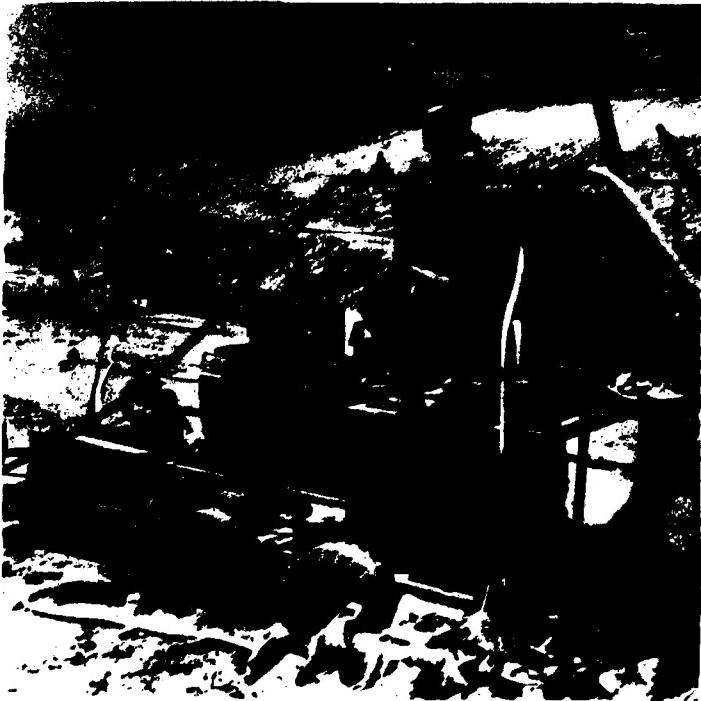
Main dam abutment and uplands grouting contract. Typical grouting operations.



Main dam abutment and uplands grouting contract. HC-150 drill rig.



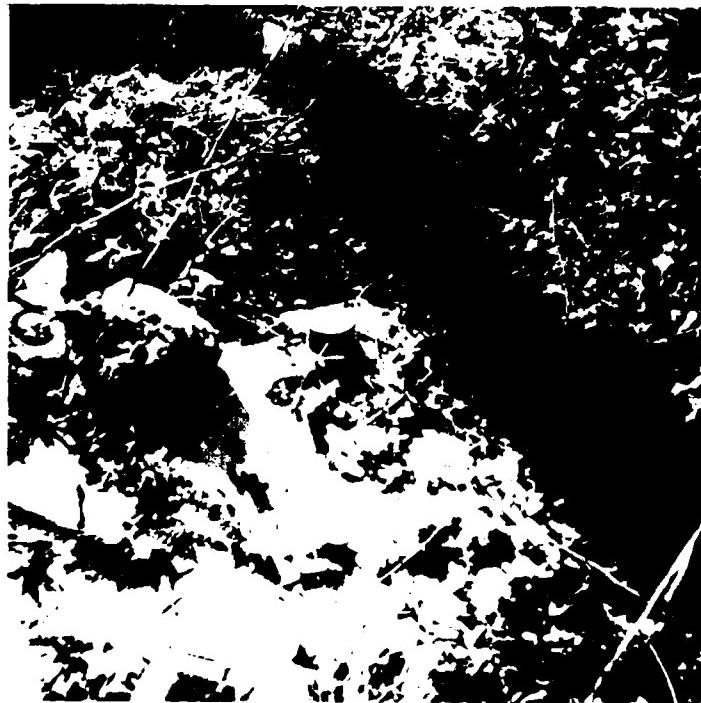
Main dam abutment and uplands grouting contract. Typical grout header arrangement.



Main dam abutment and uplands grouting contract. Grouting plant assembly.



Main dam abutment and uplands grouting contract. Laborer cleaning out vacuum seal pump on a grout plant.



Main dam abutment and uplands grouting contract. Grout communication to an old exploratory boring located to east approximately 130 feet away from the injection point in Section 9 on the right abutment.



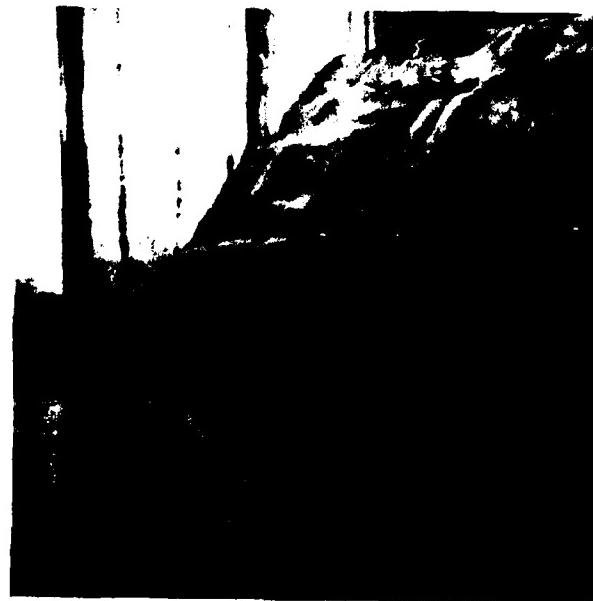
Main dam abutment and uplands grouting contract. Lower gallery modification. View of placing sump in Monolith D-14. Note presence of red dye in screen.



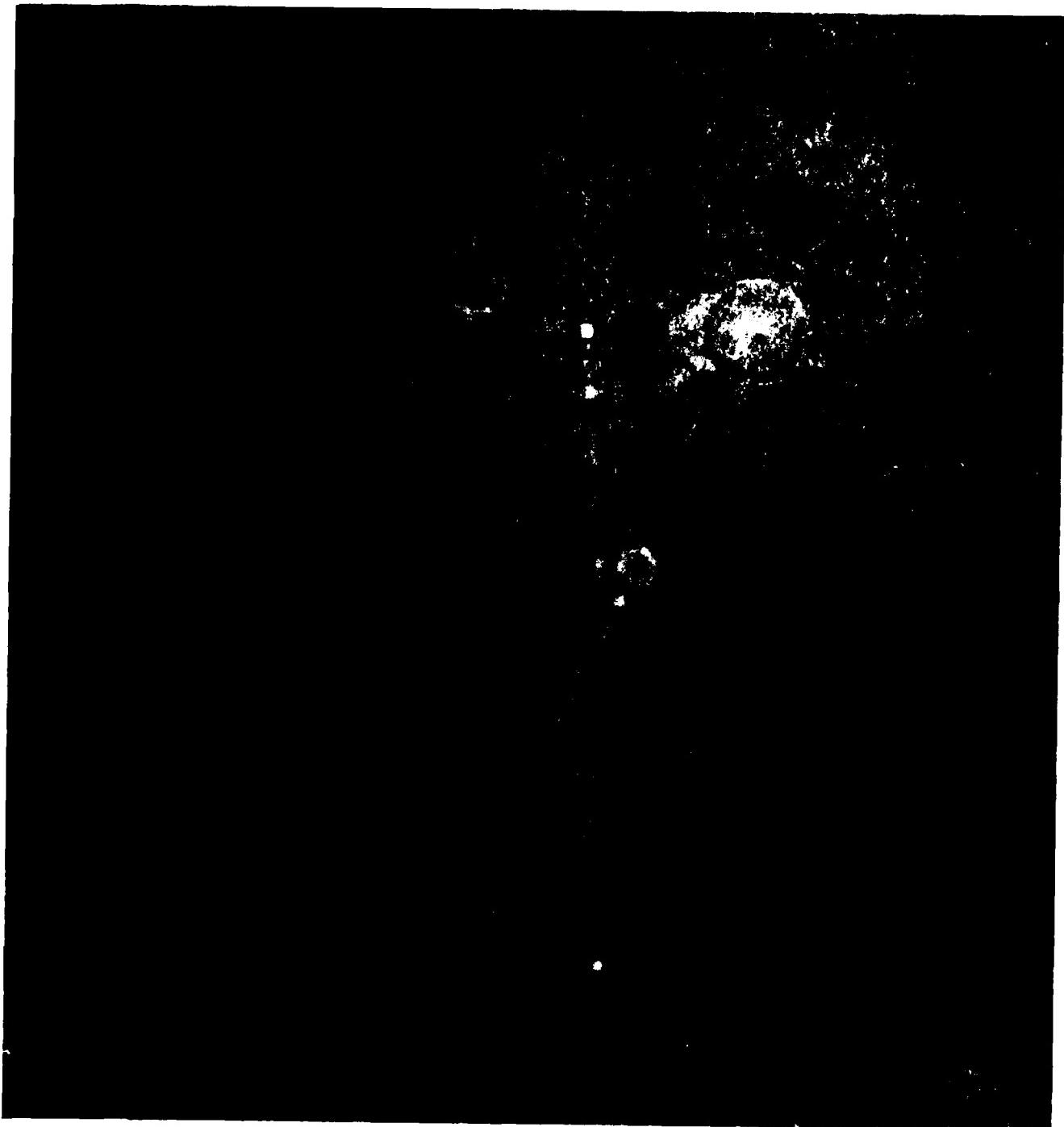
Main dam abutment and uplands grouting contract. Lower gallery modification. View of 3L6 Moyno pump with placing sump on the left.



Main dam abutment and uplands grouting contract. Lower gallery modification. Grouting in Monolith D-14. Typical header and packer arrangement.



Main dam abutment and uplands grouting contract. Close-up of dyed grout venting from extensometer and adjoining crack in shotcrete. View from base of upstream shotcrete looking southeast to dam.



Main dam abutment and uplands grouting contract. Lower gallery modification.  
View of C.P. 65 air drill on near-horizontal exploratory hole.

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